

meant insanity from coarse brain disease; but under it he describes a typical case of senile insanity, in which apoplexy fortuitously occurred.

His experience, as regards epileptic insanity, differs from that of the great majority of authorities, as he believes that *petit mal* is *not* so frequently accompanied by mental disturbance. His experience in traumatic insanity has been limited. The connection between syphilis and insanity in many of his cases of syphilitic insanity is merely coincidental.

The lectures on alcoholic insanity ignore one of the most typical symptoms of the chronic psychosis. The section on rheumatic and gouty insanity contains nothing new, nor newly put.

The section on phthisical insanity is one of the most interesting and valuable in the book. The lecture on uterine and ovarian insanity does not show that these psychoses differ from hysterical insanity. The lectures on the masturbatory, lactational, puerperal, hysterical, pubescent, and adolescent psychoses exhibit the usual faults and vices resulting from etiological classification. The eighteenth lecture contains much matter of interest, but the curious blunder is made of regarding Laura Bridgman as a case of idiocy. The book, as a whole, panders to a taste for the "practical," which is much too common. The author has not a philosophical mind, and as a result his observations are of value chiefly as detached facts. To the philosophical alienist the book is of value as a storehouse of isolated facts. For the use of the student and general practitioner, it is not to be recommended. The plates are coarse, and of no value. The book is typographically not up to the usual standard.

J. G. K.

**Physiologie des Muscles et Nerfs.** Leçons professées à la Faculté de Médecine. Par CHARLES RICHEL. Pp. 924. Paris: Librairie-Germer, Baillière, et Cie.

No more fascinating field of investigation offers itself to the physiologist than that of nerve and muscle. The chemical, the microscopical condition of nerve and muscle fibre, of nerve and muscle cell, are obvious; delicate instruments of precision record the results of the correlated parts; but underlying it all, ever eluding the pursuit of the most diligent student, is that subtle process evolved in cerebral cell, traversing nerve paths, diffusing through muscle tissue, which results in muscle action. With such a subject it is no wonder that Prof. Richet can spread before the reader nearly a thousand pages of experiments, deductions, and theories of his own and of others, and nevertheless apologize in his preface that his work cannot claim to be a complete treatise on the general physiology of nerve and muscle tissues.

The author takes in turn the muscle, the nerve, and the brain, and analyzes them, first histologically, then chemically, afterwards with reference to the effect of external agents under varying conditions of rest, action, and fatigue. The changes brought about by heat, electricity, and toxic agents are also shown. The interesting

and instructive myograms of Marey are reproduced in the chapters on muscular contraction, tetanus, and muscle excitability and in that upon elasticity, work, and force of the muscle. From his own experimentations he illustrates in the same graphic manner the traces obtained in cerebral excitability. This unifying process of the action of muscle, nerve, and cerebral cell excitability, is one of the most striking and interesting features in the book. "The myographic curves," he says, "give, in a manner, the schema of the law of reaction of the tissues. A muscular contraction is composed of three periods visible and capable of analysis, when a single electrical excitation is used. There is at first the latent period, then a period of ascension, then a period of descent. The duration of these three periods is correlative. If the muscle is fresh, if the excitation is strong, the three periods are very rapid; in the contrary case they are slow. Remark that the excitation is extremely short, since the duration of the electric spark is even less than the sixty-thousandth of a second. The response of the muscle is prodigiously long compared to the brevity of the excitant. Each excitation leaves then after it, a re-echo, a vibration more or less prolonged, and in every case longer than the excitation itself.

"It is not necessary that there may have been an excitation and a response to it, that the response of the muscle should be apparent; often there are attending conditions which mask the phenomenon. There are sometimes after a very short excitation a prolonged latent contraction. This latent contraction is none other than an augmentation of excitability; or, rather, we can make the phenomenon of augmentation of excitability return again in the phenomenon of latent contraction.

"If one passes from the muscle to the nerve substance, the same phenomena are found. Each excitation leaves after it a long impression. \* \* \*

"For the higher encephalic nerve centres, the impression caused by a single excitation is even more lasting. A violent electrical discharge produces a painful shock, which lasts ten minutes or more."

This reasoning erects for the author, upon the material basis of his subject, a scaffold sufficiently lofty and strong for him to pass over into its most occult and difficult regions. All is made easy and plain. He thus continues:

"Indeed, more, because of the special perfection peculiar to the encephalic nervous system of superior beings, these excitations from without can fix themselves definitely in the intelligence, and be stored up there. This is the faculty of memory; for memory can be considered like a prolonged retention, almost indefinitely, of an excitation. Although the physiological explanation of this phenomenon may be yet extremely obscure, we can, however, compare the memory of the brain to the memory of the cord, and to the prolonged retention of a single, short excitation on the muscle."

He concludes thus: "That which was a presentiment to the penetrating genius of Descartes, modern science proves. Living beings are veritable machines—machines extremely delicate and complex, but machines nevertheless, which are arranged in such a manner that they react according to inscrutable laws to external forces. This necessary reaction of the being to changes gives rise to the impression that the apparent spontaneity of superior animals is only one of the modes of irritability, for although the living machine appears to produce force, it does not produce it spontaneously; never, except in response to an excitation from without. Its activity is only an activity of response; but, thanks to the accumulation in the organism of chemical forces of tension, the freeing of power brought about by an external impression is enormous, and out of all proportion with the external impression.

"Above all, the nerve cell (Encephalic) possesses an extreme latent energy; but it responds to an excitation according to the same laws as that of the nerve fibre and muscle."

It may be well, since the author has reduced every thing in connection with his subject to a question of irritability, to state his definition. He sets aside that of Virchow: "The property of living bodies, which renders them susceptible of passing into a state of activity under the influence of irritants—that is to say, of external agents"; and that of Claude Bernard: "Irritability is the property of a living element to act according to its nature under an external provocation"; and gives the following: "The property of a living element to react according to its nature to external forces which modify quickly its actual state."

The reader may think that we have made too prominent that portion of this extensive volume which deals with the metaphysical, and what must ever remain conjectural, to the exclusion of the physiologically practical. We have done so for two reasons. In the first place, because it is in this that the individuality of the writer and his work is most exhibited. It is in this field that his investigations have taken a unique and pleasurable turn. So much have his studies in connection with this work extended in this direction, that he thought to entitle it "Lessons on Irritability." In the second place, this prevailing idea is so artistically carried to its climax, that it fixes the attention and claims it.

Professor Richet is delightful in his style, and the reviewer would fain elaborate other portions of his work, did space permit. Especially interesting are his discussions of the theories of rigor mortis, muscle electricity, luminous insects, and electrical fishes, the chapters on pathological physiology of the muscles, the historical study of the nervous system, reflex action and the laws governing it. In fact the whole book is to be commended, and the purpose of this review will be fulfilled if it leads to its perusal.

G. P.